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Research Article

The poorly-known amblypygid fauna (Arachnida, Amblypygi) of Honduras, Central America: an overview

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Abstract

A significant study of the amblypygid fauna of Honduras is lacking. Historically, species were misidentified and data on distribution, natural history and conservation status of the known species are lacking or insufficient. In this contribution, an overview on the amblypygids of Honduras, including taxonomy, distribution, natural history and comments on their conservation are provided. In a review of the literature of the Honduran amblypygids, we examined 21 works, including books, unpublished thesis, articles, the World Amblypygi Catalogue (2023), as well as the website Arácnidos de Centroamérica and the citizen-science websites Alamy, iNaturalist and Flicks. Only the family Phrynidae, with the genera *Paraphrynus* Moreno, 1940 and *Phrynus* Lamarck, 1801, is known to occur in Honduras. A total of seven species have been recorded, but only four [*Paraphrynus laevifrons* (Pocock, 1894), *Phrynus palenque* Armas, 1996, *Ph. similis* Armas, Víquez & Trujillo, 2017 and *Ph. whitei* Gervais, 1842] have been positively identified. No endemic species are known, but available data suggest that some undescribed new species may be restricted to Honduras. In order to understand the amblypygids of Honduras, sampling within the country must be conducted and revisionary studies will be needed. This paper examines our current knowledge of the fauna.

Key words: Neotropics, *Paraphrynus*, Phrynidae, *Phrynus*, tailless whipscorpions, whip spiders

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Introduction

Amongst the arachnids, the order Amblypygi Thorell, 1883 represents a small group of charismatic organisms that, by their general aspect, resemble true spiders (Araneae). In contrast, they have a large antenniform first pair of legs and strong pedipalps armed with internal (mesal) spines (Fig. 1). They also differ from true spiders, except the Mesothelae, by the segmented abdomen. Known also as whip spiders and tailless whipscorpions, these non-venomous arachnids are predators, feeding mostly on arthropods and small vertebrates, although cannibalism and necrophagy can occur (Weygoldt 2000; Garcia Rivera et al. 2009; Prous et al. 2017; Torres et al. 2019; Thomas 2020; Trujillo et al. 2021).

Amblypygids occur in tropical and subtropical areas and, in Europe, are restricted to select areas in the Mediterranean (Weygoldt 2000; Blick and Seiter 2016; Miranda et al. 2021b). They are mostly nocturnal. Genera such as *Charinus*, *Heterophrynus* and *Paraphrynus* are common in humid caves, synanthropic and urban species are known, but most amblypygids dwell in humid forests (Weygoldt 2000; Chapin and Hebets 2016), mainly under bark and stones or in crevices and between the litter, where they secure refuge during the day.

Fourteen amblypygid species are found in Central American (5.34% of the 262 worldwide known), belonging to the genera *Charinus* Simon, 1892 (Charinidae Quintero, 1986), *Paraphrynus* Moreno, 1940 and *Phrynus* Lamarck, 1802 (Phrynidae Blanchard, 1852) (Beron 2017; Miranda et al. 2021a; World Amblypygi Catalogue 2023). Neither *Heterophrynus* Pocock, 1894 nor *Acanthophrynus* Butler, 1873 (Phrynidae) are present, the first is restricted to South America, while the second is widely distributed in the Pacific slope of Mexico, having its most eastern record in south-western Oaxaca State (Gadar Y in Armas (2006)).

The genus *Charinus* is mainly represented by small species (Neotropical taxa rarely reach 10 mm or more in total length), which prefer the humid litter of the tropical forest and also caves. Perhaps caused by their inconspicuous appearance, they have largely remained unnoticed in most of the New World countries including those in Central America. The first charinid species recorded from the isthmus was an immature specimen found in a cave in Belize and considered as an undescribed troglobite of uncertain generic identity (Reddell 1981: 130). Almost 40 years later, this population was described by Miranda et al. (2016) as a new species of *Charinus*. In Central America, the family Charinidae has only been recorded from Panama and Belize (Víquez et al. 2012; Miranda et al. 2021a, b), but unpublished data confirm its presence in other countries (Víquez C in Armas (2019)).

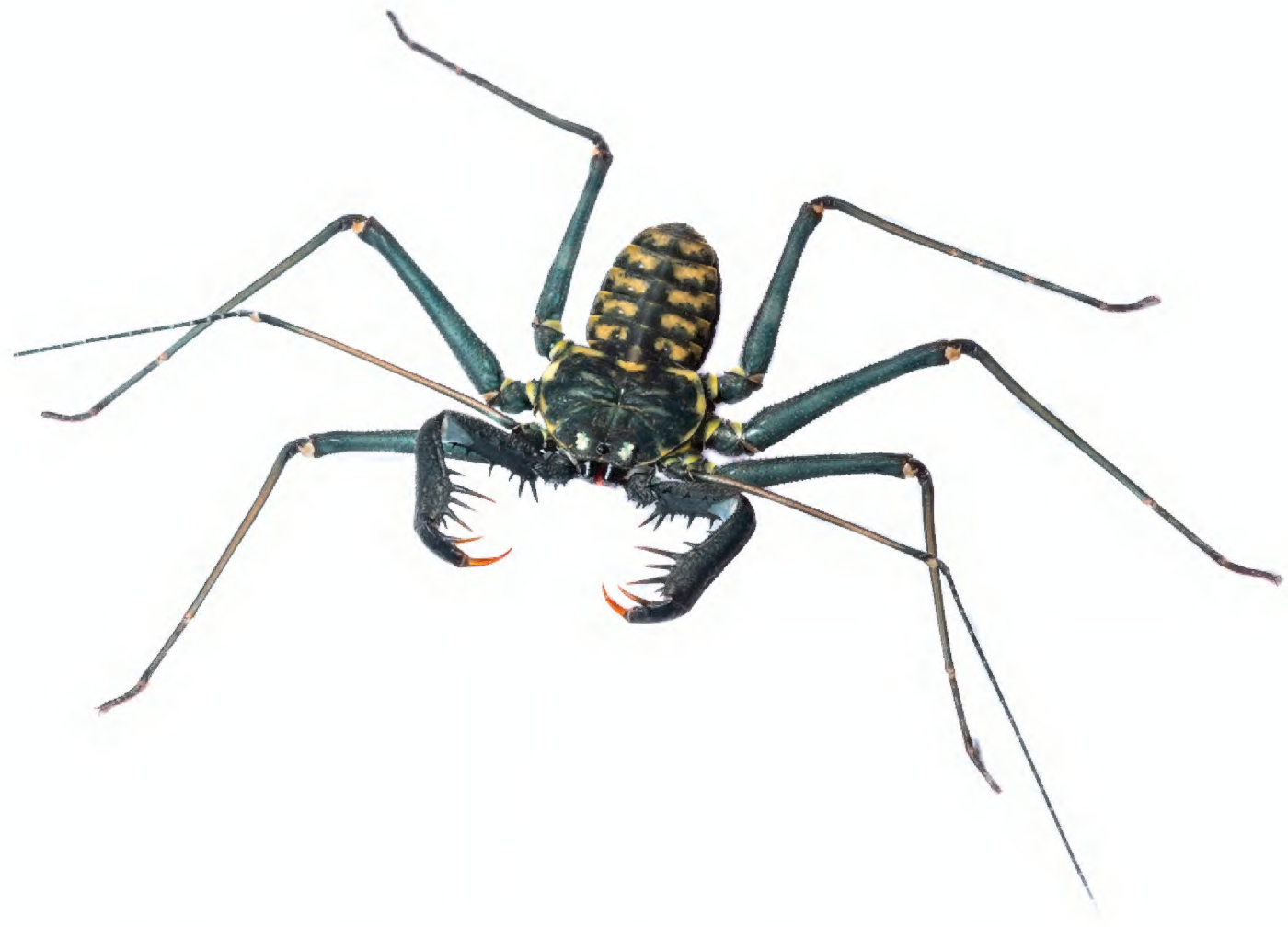

Figure 1. *Phrynus* whitei. Dorsal habitus. Photograph by Jean F. Montero.

The genus *Paraphrynus* has its highest recorded diversity (15 species) in Mexico (Armas and Trujillo 2018; Seiter et al. 2020). Three species are endemic to the West Indies (Cuba and Bahamas), whereas Central America contains six species, of which only *Paraphynus maya* Armas, Trujillo & Agreda, 2017 is restricted to this area (Mullinex 1975; Armas et al. 2017; Armas and Trujillo 2018).

With 40 known species, *Phrynus* is the most speciose genus amongst the family Phrynidae. In the Americas, it is distributed from southern Florida, USA to northern Brazil, having its highest diversity in Mexico (15 spp.) and the West Indies (14 spp.). Central America is inhabited by eight species, of which three are endemic: *Phrynus maesi* Armas, 1996, from Nicaragua; *Ph. pseudoparvulus* Armas & Víquez, 2001, from Costa Rica; and *Ph. similis* Armas, Víquez & Trujillo, 2013, from Guatemala and Honduras (Armas 2019).

As previously mentioned, the Central American amblypygids have been poorly studied (Armas 2004, 2019; Cubas-Rodríguez and Armas 2023). Monographs exist only for the amblypygid faunas of Nicaragua (Armas and Maes 2000), Costa Rica (Víquez 2003) and Guatemala (Víquez and Armas 2006; Armas et al. 2018).

In this contribution, an overview on the amblypygids of Honduras is provided and new records of additional species, confidently identified to generic level, are given.

Materials and methods

The bibliographic review on the systematics and natural history of Honduran amblypygids covers to 31 July 2023. A total of 21 works were examined, including books, articles, the World Amblypygi Catalogue (2023), as well as the website Arácnidos de Centroamérica (https://arachnids.myspecies.info/) and the citizen-science websites iNaturalist (https://www.inaturalist.org/), Flickr (https://www.flickr.com/) and Alamy (https://www.alamy.es/).

Examined specimens are deposited in Museo de Entomología de la Universidad Nacional Autónoma de Honduras (CU-UNAH). The map (Fig. 2) was generated using Quantum GIS 3.22.6 (QGIS). Geographic coordinates obtained from literature were verified. All herein included photographs are used with permission.

Results and discussion

Taxonomy and distribution

Available information on the taxonomic composition and distribution of the Honduran amblypygid taxa are very limited (Armas 2006, 2019; Armas et al. 2013; Cubas-Rodríguez and Armas 2023).

The first explicit mention of a Honduran species appears in Mullinex (1975: 12), who recorded *Paraphrynus raptator* (Pocock, 1902) on the basis of a female from La Lima, Cortés Department and a male from Útila Island, Islas de la Bahía Department. Later, Armas et al. (2013) recorded the same species from the Department of Olancho. However, Armas et al. (2017) suggested that those three records might really correspond to *Paraphrynus maya* Armas, Trujillo & Agreda, 2017 described from north-eastern Guatemala, near the border with Honduras.

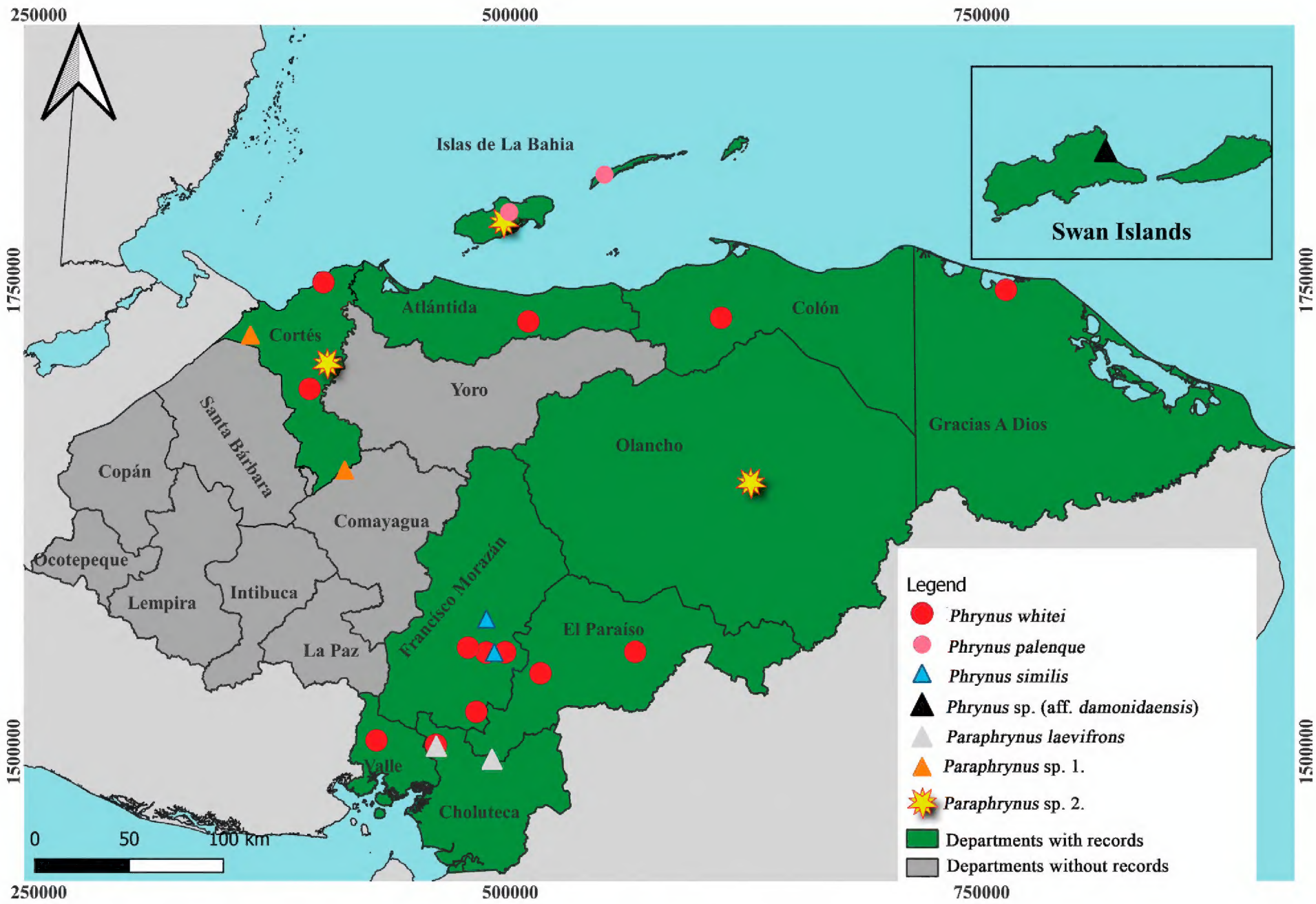

Figure 2. Distribution of amblypygid species in Honduras, Central America.

The second amblypygid recorded from Honduras was *Phrynus whitei* Gervais, 1842 (Fig. 3), a widespread species distributed from Mexico to Costa Rica. In his revision of the genus *Phrynus* in the New Word, Quintero (1981) recorded it from La Lima, Cortés Department, but in a distribution map, he also indicated its presence in other three localities from northern areas of Honduras, which were not mentioned in the text. Recently, Cubas-Rodríguez and Armas (2023) compiled the available information on the distribution of *P. whitei* in Honduras. It is the most widely distributed amblypygid species in the country (Fig. 2). On the basis of photographs from Alamy (https://www.alamy.com/stock-photo-tailless-whipscorpions-amblypygi-sitting-on-forest-ground-honduras-47935928.html), we are now able to further record this species from Rio Plátano Biosphere Reserve, Gracias a Dios Department.

The amblypygid species most recently added to the Honduran fauna, *Phrynus palenque* Armas, 1996 (Fig. 3), was recorded on the basis of an adult female collected by H. Peters in 1951 in a cave on Útila Island (Cubas-Rodríguez and Armas 2023). This specimen, together with an unidentified *Heterophrynus* species, a taxon not yet recorded from Honduras, is deposited in the Senckenberg Museum, Germany (Cat. No. 8003), but according to label data, they were erroneously identified by Carl F. Roewer in February 1954 as *Paraphrynus laevifrons*.

In the aforementioned revision of the genus *Phrynus* in the Americas, Quintero (1981) described *Phrynus damonidaensis* Quintero, 1981 from Cuba, but he also recorded it from the Swan Islands (also known as Islas del Cisne or Santanilla Islands), which are located in the Honduran Caribbean Sea. Such a disjunct distribution seems to be unusual and it is suspected that this may represent a misidentification (Ávila Calvo and Armas 1997; Armas 2004, 2019).

Figure 3. *Phrynus whitei*. Adult male from Pespire, Choluteca Department, Honduras.

Another widespread amblypygid species, *Paraphrynus laevifrons* (Pocock, 1894), was recorded from Honduras by Cubas-Rodríguez and Armas (2023), on the basis of a female from El Paraíso Department and an immature from Choluteca Department.

On the citizen-science websites iNaturalist (https://www.naturalista.mx/observations/80848785) and Flickr (https://www.flickriver.com/photos/theraphosid_systematics/7054094261/), there are pictures of some adult and immature individuals from Cusuco National Park in Cortés Department, identified as *Paraphrynus emaciatus* Mullinex, 1975, a species only known from northern Guatemala (Armas et al. 2018). According to Cubas-Rodríguez and Armas (2023), this observation is likely to be *Pa. williamsi* Mullinex, 1975 or *Pa. maya* Armas, Trujillo & Agreda, 2017.

The seven amblypygid species presently known from Honduras represent 50.0% of those described or recorded from Central America, with *Phrynus* (five species) being the most diverse and widespread genus in the country.

List and distribution of the Honduran amblypygid species

Order Amblypygi Thorell, 1883
Family Phrynidae Blanchard, 1852

Genus *Paraphrynus* Moreno, 1940

Paraphrynus laevifrons (Pocock, 1894) (Fig. 2). El Paraíso and Choluteca Departments (Cubas-Rodríguez and Armas 2023).

Figure 4. *Paraphrynus* sp. 1, from Cusuco National Park, Cortés Department. Fontal view of the prosoma. Photograph courtesy of Matt Hamer (https://www.inaturalist.org/observations/80848785).

Paraphrynus sp. 1 (Figs 2, 4). Cusuco National Park, Cortés Department (see Cubas-Rodríguez and Armas (2023)).

Paraphrynus sp. 2. La Lima, Cortés Department, and Útila Island, Islas de la Bahía Department (Mullinex 1975, as *Pa. raptator*); and Olancho Department (Armas et al. 2018, as *Pa. raptator*).

Genus *Phrynus* Lamarck, 1801

Phrynus palenque Armas, 1996 (Figs 2, 5). Útila and Roatan Islands, Islas de la Bahía Department (Cubas-Rodríguez and Armas 2023; this paper). On the citizen-science website *iNaturalist*, there are pictures of some specimens from Útila Island (https://www.inaturalist.org/observations/17184207; https://www.inaturalist.org/observations/150311100; https://www.inaturalist.org/observations/115987808, erroneously identified as *Phrynus operculatus* Pocock, 1903) and Roatán Island (https://www.inaturalist.org/observations/27060362, https://www.inaturalist.org/observations/42505595, https://www.inaturalist.org/observations/128131861), which undoubtedly belong to this species.

Phrynus similis Armas, Víquez & Trujillo, 2013 (Figs 2, 6). Francisco Morazán Department (Armas et al. 2017).

Phrynus whitei Gervais, 1842 (Figs 2, 3). Cortés, Atlántida, Colón, Gracias a Dios, Francisco Morazán, El Paraíso, Choluteca and Valle Departments (Quintero 1981; Cubas-Rodríguez and Armas 2023).

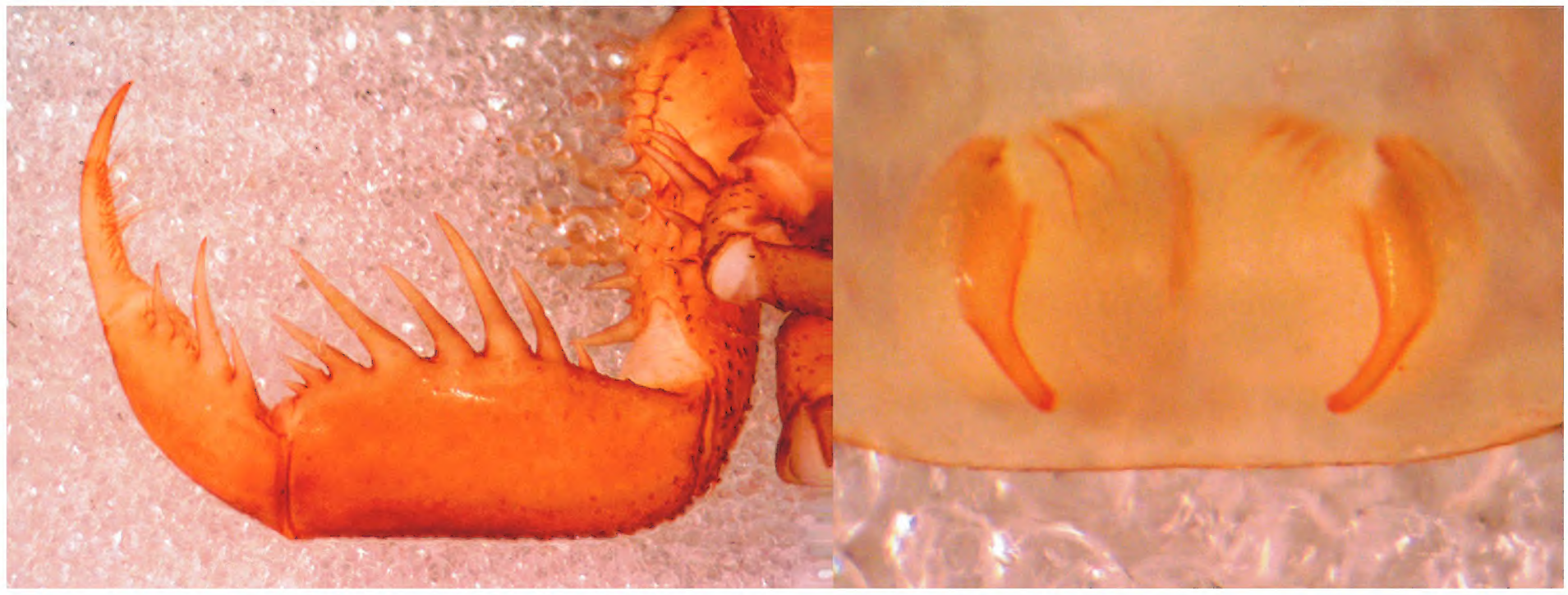

Figure 5. *Phrynus palenque*, female from a cave in Útila Island, Islas de la Bahia Department, Honduras (Senckenberg Museumn, Cat. 8003). Photographs by Abel Pérez González.

Figure 6. *Phrynus similis*. Female with young (approximately ten prelarvae), from San Antonio de Oriente, Francisco Morazán Department. Photograph courtesy of Eric van den Bherge (https://www.inaturalist.org/observations/38062921).

Phrynus sp. (aff. *damonidaensis* Quintero, 1981). Swan Islands (Islas del Cisne), Islas de la Bahía Department, Honduran Caribbean (Quintero 1981; Ávila Calvo and Armas 1997; Armas 2019).

Natural history

Details on the habitat and/or microhabitat have been given for all the species, excepting *Phrynus* cf. *damonidaensis* from Swan Islands. Predation has been recorded only for *Ph. whitei* (see Cubas-Rodriguez and Armas (2023)). The only amblypygid recorded from a cave in Honduras is *Ph. palenque*. The female specimen of this species, recorded by Cubas-Rodríguez and Armas (2023), is deposited in the Senckenberg Museum, Germany (Cat. No. 8003) and was collected in 1951 from a cave on Útila Island. Another specimen of undetermined sex was photographed on 29 July 2018 in a different cave on the same island, but a taxonomic identification was not provided (see https://www.inaturalist.org/observations/17184207).

A fly, tentatively identified as *Pseudogaurax* sp. (Diptera, Chloropidae), was recorded as an egg parasite (see https://www.flickriver.com/photos/theraphosid_systematics/7054094261/). A second instance of parasitism by flies on this species was observed by Court Harding (Fig. 7). Dipteran parasitoids of the eggs of amblypygids have been recorded for other Neotropical phrynid species (e.g. Víquez and Armas (2009); Chiriví Joya and Rojas (2013)).

Conservation status

With so little reliable information on taxonomy, distribution and natural history, it is difficult to ascertain conservation needs for any of the species. We know that at least seven amblypygid species are present in the Honduran fauna; but only four have been unequivocally identified: *Pa. laevifrons*, *Ph. palenque*, *Ph. similis* and *Ph. whitei*. The three remaining species are pending specific identification. On the basis of the current data, there are no endemic amblypygids in Honduras; however, unpublished data (pers. obs.) suggest that at least two or three undescribed species could be restricted to the country.

Of the four identified species, *Ph. palenque* is found in southern Mexico, Belize, Guatemala and Honduras (Armas et al. 2017; Cubas-Rodríguez and Armas 2023). *Phrynus similis* is known from Guatemala and central Honduras, but in the last country, it appears to be restricted to the Tilarán Range, at 1600–1700 m a.s.l. (Armas et al. 2013). The other two species have a wide distributional range, being synanthropic in some places. *Phrynus whitei* is known from Mexico to Costa Rica (Quintero 1981; Armas and Maes 2000; Víquez and Armas 2006) and *Paraphrynus laevifrons*, from south-eastern Guatemala to north-eastern Colombia, including San Andres Island, in the Caribbean Sea (Mullinex 1975; Chiriví and Armas 2012).

The species recorded from protected Honduran areas are as follows: (1) *Paraphrynus* sp. (likely *williamsi*), from Cusuco National Park (see Cubas-Rodríguez and Armas (2023)); (2) *Ph. palenque* from Islas de la Bahía National Park (Cubas-Rodríguez and Armas 2023, this paper); (3) *Ph. similis*, from La Tigra National Park and Uyuca Biological Reserve (Armas et al. 2017); and (4) *Ph. whitei*, from Pico Bonito National Park, Atlántida Department (https://gilwizen.com/wp-content/uploads/2017/08/Phrynus-whitei.jpg) and Rio Plátano Biosphere Reserve, Gracias a Dios Department (this work).

Figure 7. *Paraphrynus* sp., from eastern area of Yojoa Lake (precise Department unknown) parasitised by dipterans, likely Chloropidae. Photograph courtesy of Court Harding (https://www.inaturalist.org/observations/168571044).

Conclusions

The amblypygids of Honduras are in need of study. There is a need for collecting and verifying species determinations and distributions. Starting in January 2023, the authors began a long-term project on the amblypygids of Honduras. The primary objectives are to obtain a better knowledge of the taxonomic composition, distribution and natural history of this particular fauna in Honduras. In this respect, the first results are in Cubas-Rodríguez and Armas (2023) and the present contribution.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

Formal analysis: LFA, AMCR. Investigation: AMCR, LFA. Methodology: LFA, AMCR. Writing - original draft: LFA. Writing - review and editing: AMCR.

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Data availability

All of the data that support the findings of this study are available in the main text.

References

Ávila Calvo A, de Armas LF (1997) Lista de los Amblypygi (Arachnida) de México, América Central y las Antillas. Cocuyo 6: 332. [La Habana]

Beron P (2017) Comparative arachnogeographical analysis between the faunas of Central America and the Antilleans (Caribbeans). Historia Naturalis Bulgarica 24: 33–59. http://www.nmnhs.com/historia-naturalis-bulgarica

Blick T, Seiter M (2016) Whip spiders (Amblypygi, Arachnida) of the Western Palaearctic — A review. Zootaxa 4161(4): 586–592. https://doi.org/10.11646/zootaxa.4161.4.11

Chapin KJ, Hebets EA (2016) The behavioral ecology of amblypygids. The Journal of Arachnology 44(1): 1–14. https://doi.org/10.1636/V15-62.1

Chiriví Joya D, de Armas LF (2012) La subfamilia Phryninae (Amblypygi: Phrynidae) en Colombia. Boletin de la SEA 50: 395–402. http://www.sea-entomologia.org

Chirivi Joya D, Rojas D (2013) Primer registro de moscas parásitas (Diptera) sobre *Heterophrynus batesii* (Butler, 1873) (Amblypygi: Phrynidae) en Suramérica. Revista Iberica de Aracnologia 22: 114–116. http://www.sea-entomologia.org

Cubas-Rodríguez AM, de Armas LF (2023) *Paraphrynus laevifrons* y *Phrynus whitei* (Amblypygi: Phrynidae): distribución e historia natural en Honduras. Revista Iberica de Aracnologia 42: 225–228. http://www.sea-entomologia.org

de Armas LF (2004) Arácnidos de República Dominicana. I. Palpigradi, Schizomida, Solifugae Thelyphonida (Arthropoda: Arachnida). Revista Ibérica de Aracnología, special monographic volume 2: 1–64. http://www.sea-entomologia.org

de Armas LF (2006) Los amblipígidos o tendarapos de México (Arachnida: Amblypygi). Boletin de la SEA 39: 345–359. http://www.sea-entomologia.org

de Armas LF (2019) Diversidad de Pedipalpi (Arachnida: Amblypygi: Schizomida, Thelyphonida) de Centroamérica. Revista Iberica de Aracnologia 34: 55–68. http://www.sea-entomologia.org

de Armas LF, Maes J-M (2000) Los amblipígidos de Nicaragua (Arachnida: Amblypygi). Revista Iberica de Aracnologia 1: 39–44. http://www.sea-entomologia.org

de Armas LF, Trujillo RE (2018) Nueva especie del género *Paraphrynus* (Amblypygi: Phrynidae) de Chiapas, México. Revista Iberica de Aracnologia 32: 81–85. http://www.sea-entomologia.org

de Armas LF, Víquez C, Trujillo RE (2013) Nueva especie de *Phrynus* Lamarck, 1801 (Amblypygi: Phrynidae) de Guatemala y Honduras. Revista Iberica de Aracnologia 23: 25–31. http://www.sea-entomologia.org

de Armas LF, Trujillo RE, Agreda EO (2017) Nueva especie de *Paraphrynus* (Amblypygi: Phrynidae) de Guatemala. Revista Iberica de Aracnologia 31: 49–54. http://www.sea-entomologia.org

de Armas LF, Trujillo RE, Agreda EO (2018) Sinopsis de los Amblypygi (Arachnida) de Guatemala. Revista Iberica de Aracnologia 32: 55–72. http://www.sea-entomologia.org

de Miranda GS, Giupponi AP de L, Wizen G (2016) Two new species of whip spider (Amblypygi): An epigean and a cave dwelling *Charinus* Simon, 1892 from Belize. Zootaxa 4098(3): 545–559. https://doi.org/10.11646/zootaxa.4098.3.7

de Miranda GS, Giupponi AP de L, Prendini L, Scharff N (2021a) Systematic revision of the pantropical whip spider family Charinidae Quintero. 1986 (Arachnida, Amblypygi). European Journal of Taxonomy 772: 1–409. https://doi.org/10.5852/ejt.2021.772.1505

de Miranda GS, Giupponi AP de L, Scharff N, Prendini L (2021b) Phylogeny and biogeography of the pantropical whip spider family Charinidae (Arachnida: Amblypygi). Zoological Journal of the Linnean Society 194(1): 136–180. https://doi.org/10.1093/zoolinnean/zlaa101

García Rivera L, Montes Espín R, de Armas LF, Hernández Hernández N (2009) Necrofagia en Amblypygi (Arachnida: Pedipalpi). Boletin de la SEA 45: 505–507. http://www.sea-entomologia.org

Mullinex CL (1975) Revision of *Paraphrynus* Moreno (Amblypygida: Phrynidae) for North America and the Antilles. Occasional Papers of the California Academy of Science 116: 1–80.

Prous X, Pietrobon T, Ribeiro MS, Zampaulo R de A (2017) Bat necrophagy by a whip-spider (Arachnida, Amblypygi, Phrynidae) in a cave in the eastern Brazilian Amazon. Acta Amazonica 47(4): 365–368. https://doi.org/10.1590/1809-4392201700993

Quintero Jr D (1981) The amblypygid genus *Phrynus* in the Americas (Amblypygi: Phrynidae). The Journal of Arachnology 9(2): 117–166.

Reddell JM (1981) A review of the cavernicole fauna of Mexico, Guatemala and Belize. Bulletin of the Texas Memorial Museum 27: 1–327.

Seiter M, Reyes Lerma AC, Král J, Sember A, Divišová K, Palacios Vargas JG, Colmenares PA, Loria SF, Prendini L (2020) Cryptic diversity in the whip spider genus *Paraphrynus* (Amblypygi: Phrynidae): integrating morphology, karyotype and DNA. Arthropod Systematics & Phylogeny 78(2): 265–285.

Thomas O (2020) Predation on a Slender Anole (*Anolis fuscoauratus*) by a whip scorpion (order Amblypygi). Reptiles and Amphibians 26(3): 253–254. https://doi.org/10.17161/randa.v26i3.14429

Torres RA, de Armas LF, Tovar-Márquez JM (2019) Aspects of the natural history of *Phrynus barbadensis* (Amblypygi: Phrynidae). Revista de la Sociedad Entomológica Argentina 78(1): 12–21. https://doi.org/10.25085/rsea.780102

Trujillo LA, Gual-Suárez F, Trujillo RE, Medellín RA (2021) Arachnids that feed on vertebrate carrion: necrophagy by the whip spider *Paraphrynus raptator* (Amblypygi: Phrynidae) and its relation to the feeding behavior of the woolly false vampire bat

Chrotopterus auritus (Chiroptera: Phyllostomatidae). The Journal of Arachnology 49(3): 407–409. https://doi.org/10.1636/JoA-S-20-070

Víquez C (2003) The whip spiders from Costa Rica (Amblypygi, Arachnida). Sklipkan 8(4): 124–130.

Víquez C, de Armas LF (2006) Los amblipígidos (Arachnida: Amblypygi) de Guatemala. In: Cano EB (Ed.) Biodiversidad de Guatemala. Vol. 1 Universidad del Valle de Guatemala, Guatemala, 307–318.

Víquez C, de Armas LF (2009) Parasitismo en huevos de amblipígidos (Arachnida: Amblypygi) por moscas Chloropidae (Insecta: Diptera). Boletin de la SEA 45: 541–542. http://www.sea-entomologia.org

Víquez C, Miranda R, de Armas LF (2012) First record of the genus *Charinus* (Amblypygi: Charinidae) from Panama. Revista Iberica de Aracnologia 21: 56–58. http://www.sea-entomologia.org

Weygoldt P (2000) Whip spiders (Chelicerata: Amblypygi). Their biology, morphology and systematics. Apollo Books, Stenstrup, Denmark, 163 pp.

World Amblypygi Catalogue (2023) World Amblypygi Catalogue. Natural History Museum Bern. http://wac.nmbe.ch [Accesed on 24 November 2023]